

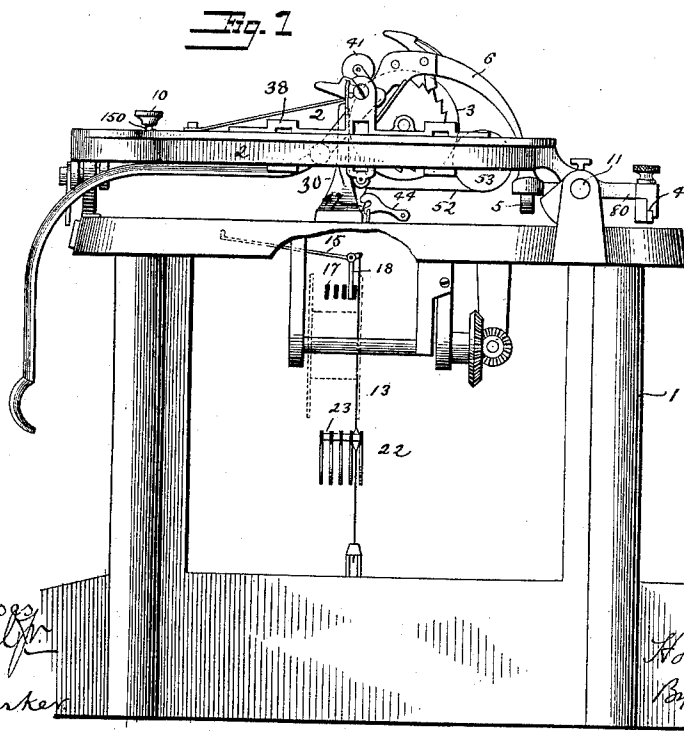
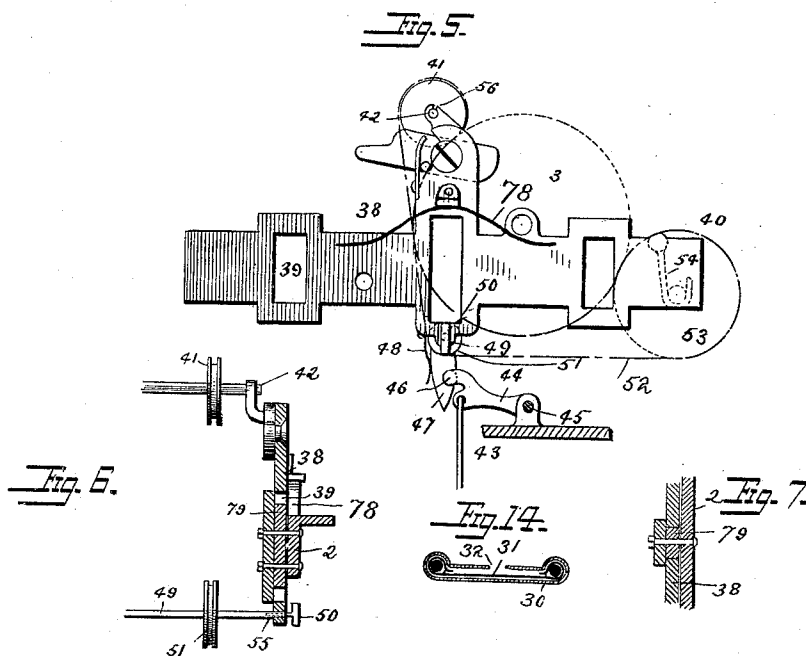
(No Model.)

3 Sheets—Sheet 1.

H. K. LAMB.  
TYPE WRITING MACHINE.

No. 466,947.

Patented Jan. 12, 1892.



Witnesses  
J. S. Barker

Inventor  
Horace K. Lamb  
By *John O. Brown*  
Attorneys

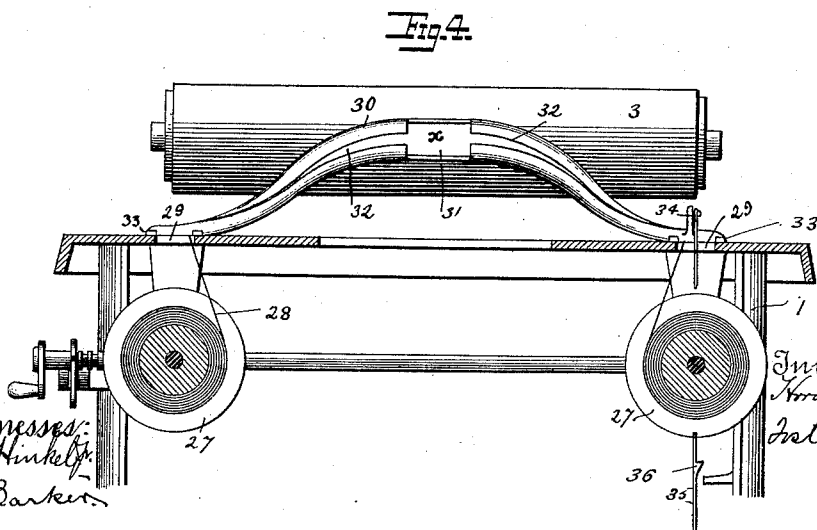
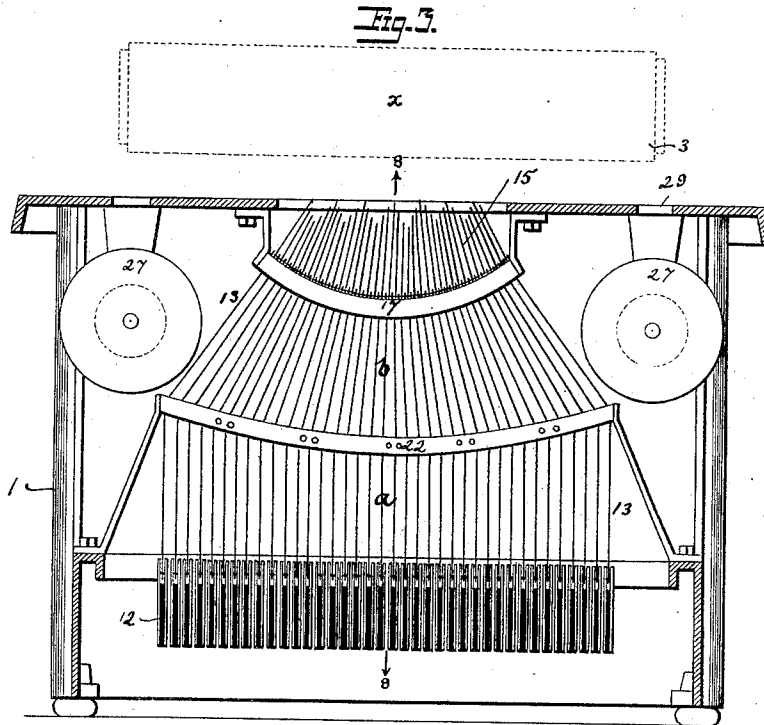
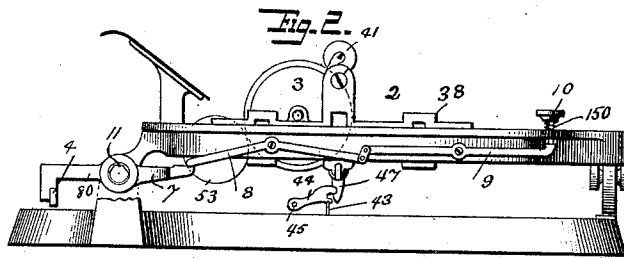
(No Model.)

3 Sheets—Sheet 2.

H. K. LAMB.  
TYPE WRITING MACHINE.

No. 466,947.

Patented Jan. 12, 1892.



2 Witnesses:  
J. H. Hinkley  
J. S. Barker

Inventor,  
H. K. Lamb  
J. S. Barker

Attorney

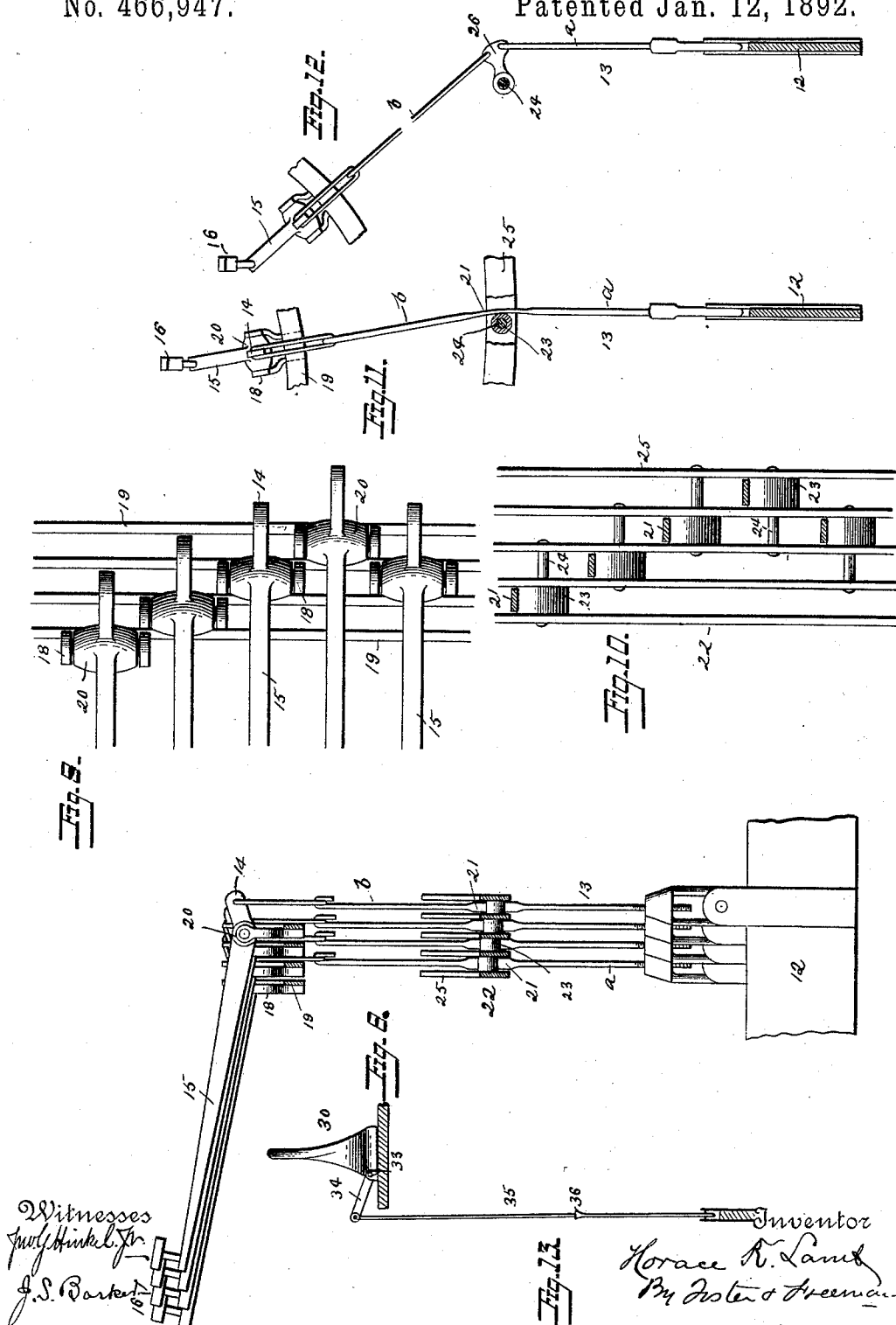
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3 Sheets—Sheet 3.

H. K. LAMB.  
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Witnesses  
J. S. Barker  
J. S. Barker

Fig. 13

Inventor  
Horace K. Lamb  
By Foster & Freeman

Attorney

# UNITED STATES PATENT OFFICE.

HORACE K. LAMB, OF WASHINGTON, DISTRICT OF COLUMBIA.

## TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 466,947, dated January 12, 1892.

Application filed November 1, 1888. Serial No. 289,710. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE K. LAMB, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

My invention relates to type-writing machines of that class in which a series of movable type-carrying levers are employed; and it consists, first, of a novel arrangement of the type-levers and their operating devices whereby the said type-levers are arranged to strike the impression-roller from its front, thus permitting the inspection of the work being done without requiring movement of the carriage; second, of a novel guide for the inking-ribbon, by which the ribbon is carried in proximity to the impression-roller and in position to be struck by the types, and which possesses certain novel features of construction pointed out; third, of a certain novel arrangement of devices for moving the impression-roller in order to cause one or the other of two characters on the types to print; and it also consists of other improvements, which will be hereinafter fully pointed out and described, and which are illustrated in the accompanying drawings, wherein—

Figure 1 is a side view of a type-writing machine embodying my invention, parts being omitted and a portion of the frame being broken away for clear illustration. Fig. 2 is an end view of the sliding carriage, looking from the side opposite to that from which Fig. 1 is taken. Fig. 3 is a diagrammatic sectional view through the frame of the machine viewed from in front, illustrating the type-levers and their connections. Fig. 4 is a sectional elevation illustrating the ribbon-guiding devices. Fig. 5 is a side view of the sliding frame carrying the impression-roller. Figs. 6 and 7 are sectional views illustrating the sliding connection of the said sliding frame with the carriage. Fig. 8 is a sectional view on the line 8 8, Fig. 3. Fig. 9 is a top view of a portion of the frame in which the type-levers are mounted. Fig. 10 is a similar view of a portion of the frame carrying the bearings for the connecting-rods which operate the type-levers. Figs. 11 and 12 are detached views illustrating two forms of con-

necting-rods by which the type-levers are operated. Fig. 13 is an end view of the ribbon-guide and its operating-rod. Fig. 14 is a cross-section detached and enlarged of one form of ribbon-guide.

Since my invention is shown as applied to a machine having the general features of the well-known No. 2 Remington type-writer, many of the parts shown in the drawings need no detailed description.

1 represents the stationary frame, and 2 the sliding carriage, the latter carrying the impression-roller 3.

4 is the ratchet-bar, which engages the usual escapement at the back of the machine. As these machines are now ordinarily built this bar is supported by rocking arms 80, sliding and turning on the bar 11, the arm at the right-hand end of the bar having an angular projection or extension 5 in position to be struck by the rear end of the line-feed lever 6, by which the roller 3 is turned, and provided at its end with a finger-piece, by pressing on which the operator may elevate the ratchet-bar from engagement with the escapement, thus leaving the carriage free to be moved in either direction. From this arrangement it follows that the operator must use his right hand in order to elevate the ratchet-bar, and by reason of the arm 5 being at the rear of the carriage the hand must be carried over the carriage-frame to the rear in order to reach the said finger-piece. Instead of such arrangement I provide devices whereby the ratchet-bar is elevated by means of a vertically-movable key situated near the front edge of the carriage. Thus 7 is an arm projecting forward from the left-hand rocking arm 80 and connected by a train of levers 8 9 or otherwise with a finger-key 10, located above and at the front left-hand portion of the carriage, so that by pressing down upon this key, which is normally held elevated by a spring 150, the ratchet-bar will be raised from the escapement.

The position of the key 10 is most convenient, since it moves vertically and is situated close to and in view of the operator and is in position to be operated by his left hand, thus leaving the right hand free to strike whatever type-key is required, advantages which will be appreciated by all users of type-

writers, especially in cases where great speed is required.

Should the key 10 be located at the right-hand end of the carriage instead of in the position shown, the advantage of having the key in sight and at the front edge of the carriage will be retained, although I prefer the location described, for the reason that it is in position to be operated by the left hand, and for the further reason that if located at the same end of the carriage-frame as is the lever 6 an operator might catch the key 10 and the said lever at the same time—the thumb pressing on the key and the fingers catching under the lever—and thus the roller 3 be turned when it was only intended to elevate the ratchet-bar, an operation which my preferred arrangement renders impossible.

In order that the writing or printing may be inspected by the operator without requiring that the carriage should be lifted or tilted, I so arrange the type-levers and their operating connections that the type shall be made to strike the roller along its front central horizontal line directly before the operator, instead of at the bottom of the roller, as is now ordinarily done. To effect this result I arrange the parts in the following manner:

12 designates the levers which are mounted in the lower part of the frame 1 and carry at their forward ends the finger-keys or contact-pieces, these parts being arranged in the usual manner. The levers 15, carrying the types 16, are pivoted on centers arranged in one or more transverse lines extending across the machine, and are so arranged that when elevated each type shall strike the roller in front at the point *x*, Figs. 3 and 4. The supporting-frame for the pivots of these levers is situated in a vertical plane and is curved or drooping and extends transversely beneath the top plate of the frame 1, and in order to accommodate the required number of type-levers they are arranged in several banks or rows, with their pivots in different parallel vertical planes, four being a convenient arrangement, and that number is shown in the drawings. (See particularly Figs. 8 and 9.)

The levers 15 are shown as being of the kind now in common use, having the arms 14, to which the connecting rods or links 13, uniting them with the levers 12, are attached, and the hubs 20, provided with the pivot-pins which are mounted in the lugs 18, rising from the separated parallel bars or plates 19, constituting the frame 17.

Since it is desirable that all the levers 15 should be of uniform length, it is necessary that the frame 17, in which they are mounted, shall be curved in order that the types shall all be brought to the same center or point *x* when elevated; and, further, since the ordinary type-levers are only about three inches long, it follows that the length of the frame 17, in order that all the types shall strike at the point *x*, must be much less than it is desirable should be the width of the key-board,

and hence the width of the series of levers 12. This makes it necessary to employ diverging connections between the levers 12 and the arms 14 of the type-levers, so that all the connecting rods or links 13, except the central one, shall be inclined or bent in order to connect the levers 12 with the arms 14 of their respective type-levers. I consider it preferable to bend the connecting-rods rather than that they should throughout their entire length occupy an inclined position, and so I have illustrated them in the drawings.

22 represents a frame, preferably curved as shown, arranged below the frame 17 and supported from some stationary part of the machine and of a length equal to the width of the key-board—that is, the distance across the levers 12. In this frame are arranged bearings 23 for the connecting-rods 13, each of which rods consists of a vertical non-flexible portion *a*, extending from the lever 12 to its bearing 23, and an inclined non-flexible portion *b*, extending from the said bearing to the arm 14 of the type-lever to which it is connected.

In Figs. 1, 8, and 11 I have shown the rod 13 as consisting of a continuous wire flattened between the non-flexible parts *a* and *b* thereof, forming a thin flexible connection 21, at which place the rod bends as it contacts with the bearing 23, which by preference consists of an anti-friction roller mounted upon a stud 24. As shown in Fig. 10, the frame 22 consists of a number of parallel plates so arranged that the spaces between them correspond in vertical position with the ends of the arms 14. The studs 24 are by preference of a length sufficient to pass through three of the plates 25, so that besides forming supports for the anti-friction rollers 23 they also lie in the rear of the flat portions 21 of the rods next thereto and serve as stops to prevent their springing too far away from their bearing-rollers when the keys are being operated rapidly.

The connecting-rods between the outermost levers 12 and 15 are necessarily bent to an extent considerably greater than those near the center of the machine, and in practice it might be found that such outermost rods would break were they of the form shown in Figs. 8 and 11 at the places where they are flattened by reason of the strain and rapid bending to which they are subjected when being operated. For this reason I prefer to employ the form of connecting-rods shown in Fig. 12, wherein the two parts *a* and *b* of the rod are connected to an arm or lever 26, constituting the bearing, vibrating upon the stud 24. Where the type-levers are arranged as described, they lie compactly with their types 16 close to the front of the machine and near the top of the frame 1 thereof. A very important advantage results from this arrangement, since it enables the types to be cleaned without having to elevate each one separately and hold it while being brushed or otherwise cleaned. When the type-levers are made to

strike in the manner set forth, the inking-ribbon must be carried in front of the roller 3, and I will now describe the means whereby this is accomplished, reference being had to Figs. 1, 4, and 13.

27 27 are the spools upon which is wound the inking-ribbon 28, and whence it passes upward through openings 29 in the top plate of the stationary frame to a ribbon-guide 30, situated between the said openings and with its ends covering them. Its central portion, which is situated close to and directly in front of the point  $x$  on the roller 3, is cut away to form an opening 31, through which the types operate to force the inking-ribbon against the paper upon the roller.

The passage in the guide 30, through which the ribbon moves, makes a quarter-turn from each end to its central portion, so that the ribbon, which both enters and leaves the guide flatwise or lying in a horizontal plane, is turned into a vertical position when it reaches the opening 31, and is thus in place to be operated upon by the type. 32 indicates slots formed in the front face of the ribbon-guide. The operator can easily see the ribbon through these slots as it passes through the guide, and can thus tell when it has entirely run off from one of the spools and the direction of travel thereof needs to be reversed. It is further useful since it facilitates the threading of the ribbon through the guide, as will be understood. The ribbon-passage is contracted or otherwise shaped to cause the ribbon to turn without its becoming folded. By preference I employ a narrow ribbon, and one having a corded edge adapted to follow grooves in the guide formed therefor, as shown in Fig. 14, to insure turning of the ribbon, may be used.

A guide such as I have described interferes but little, if at all, with the operator's seeing the work being done, since it is in front of the roller 3 but for a short distance and the operator can easily see over and behind the guide where it is in front of the roller.

The guide 30 is by preference hinged at 33 to the top plate of the frame 1, so that it may be thrown forward away from the roller 3, so that erasures or other corrections may be made. If desired, the guide is provided with an arm 34, which is connected by a rod 35 with the lever 12 of one of the finger-keys—for instance, the one at the right-hand end of the upper bank of keys, commonly known as the "lower-case" key, not ordinarily used. This rod 35 is preferably provided with a catch 36 of some sort, adapted to engage with a stop on the frame of the machine when the key is depressed and arranged to hold the ribbon-guide in position away from the roller. The stop and catch 36 should be so related to each other that their engagement may be broken by a slight pressure tending to force the ribbon-guide toward the roller 3—as, for instance, the striking of one of the types against the ribbon or a slight forward press-

ure upon the guide itself. From this arrangement it results that should the operator fail to return the ribbon to the position for printing before commencing to operate the keys the elevation of the first type-lever 15 will, nevertheless, bring it into proper working place.

When types each having two characters thereon are employed and are arranged to strike the roller in front instead of from below, it becomes necessary to shift the roller 3 vertically in order to change from one to the other of such characters. To secure this movement the impression-roller and the parts connected therewith are supported in a frame capable of limited vertical movement, and the frame I prefer to employ consisting of two plates 38, suitably supported upon the inner faces of the ends of the carriage-frame, and suitable transverse connecting parts to be hereinafter referred to. These plates 38 are provided with vertical slots 39, in which are arranged the bearings 79 for the said sliding frame carried by the end pieces of the carriage.

When the letters are arranged upon the types in the ordinary manner, the plates 38 and the parts carried thereby will be normally held in their elevated position by springs 78 or otherwise.

When it is desired to depress the roller 3 and its supporting-frame so that the upper-case character on the type shall print, the proper finger-key is pressed down, the lever 12 whereof is operatively connected with a vertically-movable transverse rod or bar 46, with which rod or bar the sliding plates 38 are connected. I prefer that the rod or bar 46 shall be carried by two links 44, fulcrumed to a rod 45 or other suitable supports carried by the stationary frame of the machine, one or both of which arms are connected by the link or links 43 with the lever 12 of the upper-case key. The connection between the sliding roller-carrying frame and the bar 46 must be sliding to allow for lateral movements of the carriage and detachable to permit the carriage to be tilted up and back on the bar 11. This sliding detachable connection I secure by means of spring-actuated catch-dogs 47, the catch-lips of which engage with the rod 46, being held in such engagement by the springs 48. The dogs 47 are secured upon a through-shaft 49, which is provided at one or both ends with heads 50, by which it can be turned so as to throw the dogs off from engagement with the rod 46, when the carriage will be free to be turned upon the shaft 11, on which it slides. The lower ends of the dogs are beveled upon one face, so as to insure the engagement of the catch-lips thereof with the rod 46 when the carriage is let down. The front ends of the links 44 are bifurcated or otherwise shaped so that the dogs may slide past them without interference.

The tapes or elastic bands 52, by which the paper is held at the ends upon the roller, pass

around pulleys 41, 51, and 53, mounted, respectively, upon the shafts 42 and 49 and the ends of the pressure-roller 40.

In order that the tapes or bands 52 may be easily replaced, it is desirable that the pulleys over which they pass should be removable from their bearing. Thus the shaft on which the pulley 53 and roller 40 are supported is detachably mounted in the usual hooked links 54. The head or heads 50 are carried by a screw-threaded stem 55, which, being removed, permits the bands to be slipped over the ends of the shaft 49, while the shaft 42 may be removed from its bearings through the slot 56.

While I have illustrated my invention as adapted to a machine having the general characteristics of the Remington No. 2 type-writer, I do not wish it to be understood as limiting the various parts of my invention to the combination with that machine or style of machine, since it will be evident that by slight changes in the arrangement, shape, &c., of the parts my invention in whole or in part may be adapted to machines differing very widely in their general characteristics.

I do not claim to be the inventor of a catch or fastening device carried by the laterally moving or sliding carriage and arranged to engage with some portion of the frame of the machine to prevent the carriage from swinging away from the frame when the machine is tipped or turned over, and which leaves the carriage free to perform its movements as is necessary in the act of using the machine.

Without limiting myself to the exact construction shown and described, I claim—

1. The combination, with the sliding carriage carrying the roller 3, of a series of type-levers pivoted below the said roller and in bearings in a transverse frame, the said bearings being arranged in several parallel vertical planes in front of the roller 3 and on curved lines in such planes, and keys connected to move the said levers, substantially as set forth.

2. The combination, with the sliding carriage carrying the impression-roller, of a series of type-levers, a transverse frame consisting of a plurality of separated parallel plates, and bearings attached to each plate in which the said levers are pivoted in a plurality of rows, substantially as set forth.

3. The combination, with the sliding carriage carrying an impression-roller, of the key-levers, the type-levers pivoted in a frame situated in a vertical plane shorter than the distance across the key-levers, and diverging connections between the type-levers and said key-levers, substantially as described.

4. The combination of the series of key-levers, the type-levers, the frame in which the type-levers are pivoted shorter than the distance across the key-levers and arranged in a vertical plane extending transversely above the key-levers, the bent or angular connecting-rods between the key-levers and the type-levers, and the bearings for said rods adjacent

to the places where they bend, substantially as described.

5. The combination of the key-levers, the type-levers, the frame in which the type-levers are mounted, extending transversely above the key-levers, the connecting-rods consisting each of the substantially vertical part *a* and the inclined part *b*, connected together, and pivoted bearings for said rods at the points of connection, substantially as described.

6. The combination of the key-levers, the type-levers, the connecting-rods between the said levers, consisting of the non-flexible parts *a*, *b*, which parts are united by flexible connections, and bearings for the said flexible connections, substantially as described.

7. The combination of a key, a type-lever, a connecting-rod consisting of a single piece of wire flattened to form a flexible portion 21, and a bearing 23 for the said flattened portion of the connecting-rod, substantially as described.

8. The combination of the key-levers, the type-levers, a curved frame 17, consisting of a plurality of parallel plates in which the type-levers are pivoted, the bent connecting-rods between the said levers, the frame 22, and bearings for the said connecting-rods supported by the said frame 22, substantially as described.

9. The combination of the key-levers, the type-levers having the arms 14, a curved frame in which the type-levers are pivoted in several lines or rows, the connecting-rods between the said key-levers and the arms 14, a frame 22, consisting of a plurality of parallel plates, the spaces between which are in the vertical planes of the arms 14, and bearings for the said connecting-rods supported by the said frame 22, substantially as described.

10. The combination of the key-levers, the type-levers pivoted on curved lines in a transverse frame, the bent connecting-rods between the said levers, the frame 22, consisting of a plurality of plates, the bearings consisting of anti-friction rollers supported between said plates, and the studs 24, on which the rollers are pivoted and extended to form stops between which and the anti-friction rollers the connecting-rods pass, substantially as described.

11. The combination, with the sliding carriage carrying the impression-roller, of the types arranged to strike in front of the roller and the ribbon-guide 30, the ribbon-passage in which makes a quarter-turn at each end, whereby the ribbon is caused to pass from a horizontal position at each end to a vertical position in front of the roller, substantially as described.

12. The combination, with the impression-roller, of the movable printing-types, the ribbon-spools on opposite sides of the frame of the machine, and a curved guide for inclosing and directing the inking-ribbon close to the roller and cut away to form an opening

through which the types strike, substantially as described.

13. The combination, with the impression-roller, of the movable printing-types and an inclosing guide for directing the inking-ribbon close to the roller, provided with the slots 32 in the direction of its length, substantially as set forth.

14. The combination of the impression-roller mounted above the top of the stationary frame of the machine, the ribbon-spools mounted below the top of the frame of the machine upon opposite sides thereof, and a hinged guide above the top of the machine, extending substantially in the direction of the axis of the impression-roller for directing the inking-ribbon close to the surface thereof, substantially as set forth.

15. The combination, with the impression-roller, of a series of movable printing-types, a hinged guide for directing the inking-ribbon close to and in front of the roller, a key-lever for rocking the said guide on its hinges, a rod connecting the said key-lever and the guide, and a catch integral with said rod for holding the said guide in its rocked position, substantially as set forth.

16. The combination of the vertically-sliding frame carrying the impression-roller, a vertically-movable rod 46, a finger-key and connections for moving said rod, and sliding

and detachable connections between the said sliding frame and rod 46, substantially as set forth.

17. The combination of the vertically-sliding frame carrying the impression-roller, a vertically-movable rod 46, a key connected to move the said rod, and the spring-actuated catch-dogs between the rod and the said sliding frame, substantially as set forth.

18. The combination of the vertically-sliding frame carrying the impression-roller, a vertically-movable rod 46, a key connected to move the said rod, and the spring-actuated catch-dogs mounted upon a rod 49, supported in the sliding frame and provided at one end with a turning-head 50, substantially as set forth.

19. The combination of the vertically-sliding frame carrying the impression-roller, the rod 46, the links 44, by which the rod 46 is supported, a key connected to move the links, and the catch-dogs carried by the sliding frame and engaging with the said rod, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE K. LAMB.

Witnesses:

J. S. BARKER,

A. E. T. HANSMANN.